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## ISOLATION AND SELECTION ALLIED IN PRINCIPLE

THESE are those who fully recognize the influence of natural selection in transforming the hereditary characters of a species, but are unable to see how isolation should have any effect of that kind. They say that you may divide a species into two branches between which all possibility of crossing is completely prevented, but if the environment surrounding each branch is the same, the natural selection to which each is subjected will be the same, and no divergence of character will take place. They forget that the separate branches, if prevented from crossing for many generations, are sure to develop different types of variation, and in due time different methods of using the same environment, and are therefore liable to subject themselves to different forms of selection. Again they forget that when the power of dispersal is highly developed in a species it may be exposed to diverse environments and therefore to diversity of selecting influences, and still remain one harmonious species, because free crossing is maintained between all parts of the species. As long as there is no isolation of different branches, that is, while free crossing continues, there is no permanent divergence resulting in diverse races or species, even though the one species is exposed to different forms of selection in different parts of its habitat.

Diversity of evolution, producing many divergent forms of animals, could never have arisen without continuous isolation between the different forms.

Again there are those who maintain that selection unaided by isolation can not produce transformation. It is true that divergent groups can not be produced and intensified without isolation; but a given race may be transformed by selection without being divided into two groups by isolation.

Heredity with variation is the active cause of transformation; isolation and selection are the conditions that shape the forms of heredity and variation.

It is a law of heredity, that, if those of a given stock that are most alike in hereditary characters mate with each other, there will be a tendency in their offspring to a stronger emphasis of that character.

Another law of heredity is that as long as free crossing is maintained between the different forms of a species these forms can not become widely divergent. The elephant and the mouse could never have been developed from one original stock while free crossing continued.

Now there are many ways by which the free crossing of one variation with others of the same species may be prevented, but they all come under two groups.

Under selection are classed all the influences enabling certain variations to reproduce more successfully than other variations, and so preventing free crossing between the successful and the unsuccessful. Under isolation are classed all the influences that prevent living, and sexually reproducing creatures, from freely crossing.

Under normal conditions there is no crossing between the ass and the horse, though there is reason to believe that the early ancestors of each were of one stock freely interbreeding and producing fertile offspring. If isolation had not existed for ages between them, they could not have become the separate creatures that they now are. Heredity can combine only compatible characters. In some cases, incompatible characters arise between creatures of the same race preventing any crossing between them, as when a dextrally twisted mollusk produces a sinistrally twisted one; but, in most cases, such incompatibility arises only after isolation, through geographical separation, for many generations.

In view of these facts, is it not plain, that, in the case of a variable and plastic organism, races more or less divergent will be produced, if for many generations the organism is divided into branches that are prevented from crossing? Is not such a result just as sure as the gradual transformation of the race under a slow change of climate, when the successful variations are prevented from crossing with the unsuccessful variations?

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